

ARIZONA DEPARTMENT OF TRANSPORTATION

REPORT NUMBER: FHWA-AZ95-441

# ARIZONA TRANSPORTATION TECHNOLOGY TRANSFER RESOURCE CATALOG

## Final Report

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**July 1995**

**Prepared for:**

Arizona Department of Transportation  
206 South 17th Avenue  
Phoenix, Arizona 85007  
in cooperation with  
U.S. Department of Transportation  
Federal Highway Administration

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# Technical Report Documentation Page

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16. Abstract  This project entailed compilation of information on where technology information could be obtained. The sources of information included workshops and training courses, videos and CD-ROMS, colleges, libraries, transportation organizations, newsletters, information clearinghouses, and Internet sources of information.  The catalog is intended to be updated by the Technology Transfer Center at Arizona State University on an annual basis.					
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# METRIC (SI\*) CONVERSION FACTORS

## APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.54	centimetres	cm
ft	feet	0.3048	metres	m
yd	yards	0.914	metres	m
mi	miles	1.61	kilometres	km

### AREA

in <sup>2</sup>	square inches	645.2	centimetres squared	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.0929	metres squared	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.836	metres squared	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.59	kilometres squared	km <sup>2</sup>
ac	acres	0.395	hectares	ha

### MASS (weight)

oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg

### VOLUME

fl oz	fluid ounces	29.57	millilitres	mL
gal	gallons	3.785	litres	L
ft <sup>3</sup>	cubic feet	0.0328	metres cubed	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.0765	metres cubed	m <sup>3</sup>

NOTE: Volumes greater than 1000 L shall be shown in m<sup>3</sup>.

### TEMPERATURE (exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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## APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
mm	millimetres	0.039	inches	in
m	metres	3.28	feet	ft
m	metres	1.09	yards	yd
km	kilometres	0.621	miles	mi

### AREA

mm <sup>2</sup>	millimetres squared	0.0016	square inches	in <sup>2</sup>
m <sup>2</sup>	metres squared	10.764	square feet	ft <sup>2</sup>
km <sup>2</sup>	kilometres squared	0.39	square miles	mi <sup>2</sup>
ha	hectares (10 000 m <sup>2</sup> )	2.53	acres	ac

### MASS (weight)

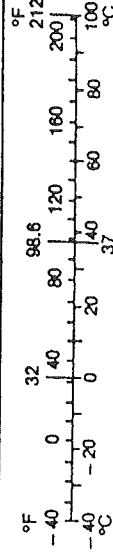
g	grams	0.0353	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams (1 000 kg)	1.103	short tons	T

### VOLUME

mL	millilitres	0.034	fluid ounces	fl oz
L	litres	0.264	gallons	gal
m <sup>3</sup>	metres cubed	35.315	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	metres cubed	1.308	cubic yards	yd <sup>3</sup>

### TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
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These factors conform to the requirement of FHWA Order 5190.1A.

\* SI is the symbol for the International System of Measurements

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# I. INTRODUCTION

Arizona Technology Transfer Resource Catalog is a publication of the Arizona Local Technology Transfer (T<sup>2</sup>) Program, hereafter referred to as the T<sup>2</sup> Program. The intent is to make the catalog a "living document" which will be continuously updated and which can be accessed directly through computer media. The catalog is a handy reference to the resources readily available through the T<sup>2</sup> Program and other sources. This chapter first provides background information about the program, particularly about its status as a repository of technology transfer resources, just one of several functions the program serves. The remainder of the chapter describes how to use the catalog to tap into the technology transfer resources.

## ARIZONA TECHNOLOGY TRANSFER PROGRAM

The T<sup>2</sup> Program, is administered under the Center for Advanced Transportation Systems Research (CATSR), located at the campus of Arizona State University in Tempe. The T<sup>2</sup> Program is funded partly by the Local Transportation Assistance Program (LTAP), begun in 1982 as the Rural Transportation Assistance Program (RTAP). Under the original charter, T<sup>2</sup> centers were created by the Federal Highway Administration (FHWA) to provide technical training and assistance to local governments, cities and towns with less than 50,000 persons. In 1991, the program was expanded to include cities up to one million in population, and the name was changed to LTAP. Currently, LTAP funds a T<sup>2</sup> program in each of the 50 states, and four additional T<sup>2</sup> Centers serve the needs of American Indian Tribal Governments.

In addition to preparation of this catalog, the current services of the T<sup>2</sup> Program include the publication of a newsletter called "AZ Transportation Tech Transfer," presentations of a variety of training workshops, distribution of training videocassettes, distribution of publications, and provision of technical field assistance.

## HOW TO USE THE CATALOG

The catalog is organized into the following remaining sections:

- Section II      Workshops/Courses
- Section III     Videocassettes and CD-ROMS
- Section IV      Other sources of information

## **Section II      Workshops/Courses**

The section on workshops/courses includes information on training workshops and courses in transportation technology related topics. Workshops are generally for a short duration such as one day, two days, or maybe one week whereas courses are for a longer duration up to a semester in length. The workshops or courses may be provided by the T<sup>2</sup> Program, Arizona Department of Transportation (ADOT) Human Resources Development Center (HRDC), State Universities, Community Colleges, professional organizations or private individuals. The workshops provided by the T<sup>2</sup> Program are offered primarily to employees of local governments. Other individuals, however, may take a workshop if space permits. The training courses offered by HRDC are primarily open to employees of ADOT, but local government employees may attend all HRDC courses. If space permits, private individuals may attend at a minimum fee. Attendance of workshops offered by others is usually open to all who satisfy any minimum requirements.

For some Community Colleges, courses may be offered on more than one campus. The individual should consult the schedule of classes for each Community College to determine which campuses will offer the course.

## **Section III      Video cassettes and CD-ROMs**

This section includes videocassettes and interactive CD-ROMs which may be borrowed from the provider generally at no cost.

## **Section IV      Other Information Sources**

The section on other sources of information includes, Arizona colleges, Arizona State data centers, Arizona transportation libraries, Arizona transportation organizations, national transportation organizations, other resource catalogs, transportation information clearinghouses, transportation mailing lists (Internet addresses), transportation newsletters, and transportation related bulletin boards. Users of this catalog should consult such sources directly since their internal content is not duplicated herein.

The major sections of the catalog are also available in the form of ACCESS databases. Each database can be accessed and searched by individual field names. A report may also be printed out for each of the databases.

## **HOW TO CONTRIBUTE TO THE CATALOG**

The T<sup>2</sup> Program continuously seeks additional resources for the catalog and comments upon the usefulness of the catalog. You may contact the T<sup>2</sup> Program Manager or staff at:

Center for Advanced Transportation Systems Research (CATSR)  
Arizona T<sup>2</sup> Program  
Arizona State University  
Box 876306  
Tempe, AZ 85287  
(602) 965-2744 (voice)  
(602) 965-2728 (fax)

Or fill out the Potential Service Provider Form at the end of this section.

## **DESCRIPTION OF TOPICS**

The catalog is arranged into fifteen topics described below. Note that although this edition of the catalog may not have an entry for every category, entries will be made as information becomes available for these categories.

### **Road Surface and Substructure**

This topic area comprises resources concerning road surface materials and their use in road construction. The subtopics include asphalt concrete, Portland cement concrete, gravel, graded earth, soils and foundations, trails, geotextiles, and construction inspection.

### **Drainage and Roadside Management**

The drainage and roadside management topic area includes resources concerning the control of the flow of surface and underground water through, under, and beside highways and also includes the overall management of all lands within road right-of-way. The subtopics include slope maintenance and slide restoration, retaining walls, and roadside development.

### **Structures**

Technology transfer resources for this topic area concern any structures that either span roadways or carry roads over water, railroads, depressed areas, and other roadways. Subtopics include bridge inspection, wood bridges, concrete bridges, steel bridges, and culverts.



## **Road Maintenance**

The road maintenance topic area comprises resources concerning road maintenance operations and inspections. The subtopics include road maintenance and low volume road maintenance.

## **Construction Vehicle Maintenance and Use**

This topic comprises resources concerning vehicle operations, preventive maintenance and repair for the vehicles used to excavate, fill, compact, transport, pave, and maintain roads. Subtopics include dump trucks, motor graders, rollers, front end loaders, wheel tractors, and mowers.

## **Transit and Other Modes**

This topic covers resources concerning public and/or mass transportation by bus, van, light rail, or railroad, paratransit, bicycle, and pedestrian travel. The subtopics include bus, paratransit, pedestrian, and bicycles.

## **Safety**

The topic comprises resources concerning the safety of drivers and passengers and the safety of transportation workers. The subtopics for safety include Occupational Safety and Health Administration (OSHA) rules and regulations, work zone signing and flagging, and the use of safety and maintenance equipment.

## **Traffic Control**

Traffic control includes resources concerning signs and all other devices used for traffic control. The subtopics include signs, signals, markings, delineators, sign management, lighting, traffic control devices, traffic operations, freeway operations, traffic signal design, and access control.

## **Environmental, Weather**

This topic includes resources concerning the impact of transportation systems upon environmental quality and the effects of environmental and weather conditions upon transportation systems. Subtopics for this category include air quality, vegetative management, hazardous materials transportation, snow and ice control, and noise.

## **Engineering**

The engineering topic comprises resources concerning engineering design, modeling, studies, and surveying. Subtopics include surveying, modeling, geometric design, pavement design, highway capacity studies, and entrance/access design.

## **Computer Methods**

Computer methods include resources concerning the application of automated methods to transportation administration, engineering, management, and planning. Subtopics include geographical information sources (GIS), computer applications, and software.

## **Management Systems**

The management systems comprise resources concerning the six mandated Intermodal Surface Transportation Efficiency Act (ISTEA) management systems and other large, integrated life-cycle transportation management systems. Subtopics include bridge management systems, safety management systems, pavement management systems, congestion management systems, intermodal management systems, public transportation management systems, freeway management systems, intelligent vehicle highway systems, and traffic signal systems.

## **Transportation Administration and Planning**

This topic includes resources concerning the management of transportation agencies, transportation planning, transportation funding, field studies, and office operations. Subtopics include administration, office management, planning, travel demand forecasting, field data collection, traffic studies, ISTEA, and the Clean Air Act Amendments (CAAA).

## **Liability and Other Legal Concerns**

This topic comprises resources concerning tort litigation, risk management, and laws that govern the design, construction, and operation of a transportation system. Subtopics include tort litigation, risk management, Americans with Disabilities Act (ADA), subdivision ordinances, and zoning ordinances.

## **Miscellaneous**

The miscellaneous topic includes subject areas which do not fall within the main topics.

## DESCRIPTION OF ITEMS IN EACH ENTRY

The entries for the workshops are organized according to the fifteen resource categories previously described. The entry for each *resource* comprises the following items:

Topic category	Audience
Media type	Date of production and revision
Resource title	Cost/terms
Description of the resource	Duration
Provider	Offer date
Contact name	Location
Contact phone/fax numbers	Prerequisites

The topic category refers to one of the fifteen categories discussed above.

The media type is the first entry such as workshop or videocassette.

The *title of the resource* appears next in the entry. For example, the title of a specific workshop or a video cassette appears after the resource category.

The *Description* provides a brief summary of the resource's educational content and its scope or length.

The *Provider* is the institution, agency, or individual who presents or produces the resource.

The *Contact Name and Telephone Numbers (voice and fax)* items indicate who can give further information about the resource. Note that Bulletin Board numbers, E-mail numbers, and Internet addresses are listed under the Fax number.

The *Audience* item further specifies the target audience as managers, administrators, engineers, technicians or other personnel.

The *Date/Revised* entry gives the date when the resource was first produced and the revision date, if any.

The *Cost/terms* item gives product cost and special conditions such as differences in cost for public or private parties, group discounts, and time limitations on services.

The *Duration* entry specifies the length of the activity. For example, a workshop may be one or two days or even longer.

The *Offer Date* is the date(s) when a resource is available.

*Location* tells where a workshop/training course is held or can be scheduled upon request.

The *Prerequisite* entry specifies the level of expertise needed to use the resource.

The entries for videocassettes include the *Category Resource Title, Descriptors, Publisher, Identification Number, Date Entered, and Length.*

## CONTACTS

The following are the names, phone numbers, and full addresses of the contact persons listed in the workshop and videocassette sections.

Arizona State Environmental  
Technology Training Center  
Pima Community College  
8181 E. Irvington Road  
Tucson, Arizona 85709-4000  
(520) 722-7872 (voice)  
(520) 722-7825 (fax)

Bob Campbell  
The Asphalt Institute  
123 N. Centennial Way, Suite 220-I  
Mesa, AZ 85201-6749  
(602) 655-8410(voice)  
(602) 827-2915(fax)

Joe Heal  
10352 N. Attaway Road  
Coolidge, Arizona 85228  
(520) 723-7805 (voice)

Gonzalo Huerta  
Arizona Western College  
P.O. Box 929  
Yuma, Arizona 85366  
(520) 344-7567 (voice)  
(520) 344-7730 (fax)

Mike Kohout  
Arizona Chapter - American Concrete Institute  
P.O. Box 52140  
Phoenix, Arizona 85072  
(602) 220-5631 (voice)  
(602) 220-5348 (fax)

Dan Bingham  
Coconino Community College  
Flagstaff Administrative Center  
3000 North Fourth Street, Suite 17  
Flagstaff, Arizona 86004  
(520) 527-1222 ext 245 (voice)  
(520) 526-1821 (fax)

Bob Hall  
Arizona Department of Transportation  
Human Resources Development Center  
1130 N. 22nd Avenue  
Phoenix, AZ 85009  
(602) 255-7613 (voice)  
(602) 256-7648 (fax)

John Hopkins  
CATSR  
Arizona T<sup>2</sup> Program  
Arizona State University  
Box 876306  
Tempe, AZ 85287  
(602) 965-2744 (voice)  
(602) 965-2728 (fax)

Bill Karlainsey  
Eastern Arizona College  
Thatcher, Arizona 85552-0769  
(520) 428-8430 (voice)  
(520) 428-8462 (fax)

Michael Penic  
Freeway Systems Research  
1621 W. Ivanhoe Court  
Chandler, Arizona 85224  
(602) 786-3170 (voice)

Ed Peters  
Central Arizona College  
Signal Peak Campus  
8470 N. Overfield Road  
Coolidge, Arizona 85228  
(520) 426-4310 (voice)  
(520) 426-4234 (fax)

Steve Schwab  
Michael Baker Jr., Inc.  
1313 E. Osborn Road, Suite 150  
Phoenix, Arizona 85014  
(602) 279-1234 (voice)  
(602) 279-1411 (fax)

Larry Strom  
Yavapia College  
1100 E. Sheldon Street  
Prescott, Arizona 86301  
(520) 776-2357 (voice)  
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Alliance for Construction Excellence  
Del E. Webb School of Construction  
College of Engineering & Applied  
Sciences  
Arizona State University  
Box 870204  
Tempe, Arizona 85287-0204  
(602) 965-5324 (voice)  
(602) 965-8172 (fax)

Jim Richmond  
Northland Pioneer College  
District Office  
103 First Avenue at Hopi Drive  
P.O. Box 610  
Holbrook, Arizona 86025  
(520) 537-2976 (voice)  
(520) 524-2227 (fax)

Jan Siedier  
International Municipal Signal  
Association  
c/o City of Mesa  
P.O. Box 1466  
Mesa, Arizona 85201  
(602) 644-2160 (voice)  
(602) 644-3130 (fax)

Al Walker  
Cochise College  
4190 West Highway 80  
Douglas, Arizona 85607-9724  
(520) 459-9761 (voice)  
(520) 459-9706 (fax)

## POTENTIAL SERVICE PROVIDER FORM

If you would like to have a training workshop included in the next edition of the catalog, please fill out the following information and return to:

John Hopkins  
Center for Advanced Transportation Systems Research (CATSR)  
Arizona State University  
Box 876306  
Tempe, AZ 85287  
(602) 965-2744 (voice) (602) 965-2728 (fax)

Topic Category
Media Type ( workshop, videocassettes, etc)
Media Type ( workshop, videocassettes, etc)
Title
Description (maximum of 255 characters)
Provider:
Contact:
Phone
Fax
Audience
Date/Date Revised
Cost
Duration
Offer Date
Location
Prerequisites

## CUSTOMER FEEDBACK FORM

We appreciate the opportunity to serve you and we need your help in providing the best services to meet your technology transfer needs. Please send in your comments to the T<sup>2</sup> Program in order for us to continually improve our services.

To: T<sup>2</sup> Program Manager

From:
Telephone:
Address:
Comments:

Please mail your comments to:

John Hopkins  
Center for Advanced Transportation Systems Research (CATSR)  
Arizona T<sup>2</sup> Program  
Arizona State University  
Box 876306  
Tempe, AZ 85287  
(602) 965-2744 (voice)    (602) 965-2728 (fax)

## II. WORKSHOPS/COURSES

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TRAFFIC CONTROL	II-9
COMPUTER METHODS	II-12
LIABILITY AND OTHER LEGAL CONCERNS	II-13
MISCELLANEOUS	II-14



## Road Surface and Substructure

### WORKSHOP

#### Asphalt Materials

This workshop addresses what is asphalt, asphalt cement, cutbacks, emulsions, the use of a variety of susceptibility, typical temperatures for various applications, additives, and aggregates.

**Provider:** CATSR/Technology Transfer

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** All field personnel

**Date/Revised:** 1995

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Construction experience

### WORKSHOP

#### Concrete Field Testing

Basics in the testing of concrete placement for construction projects.

**Provider:** American Concrete Institute

**Contact:** Mike Kohout

**Phone:** (602)220-5631

**FAX:** (602)220-5348

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$115

**Duration:** 2 days

**Offer Date:** To be scheduled

**Location:** Phoenix

**Prereqs:** None

### WORKSHOP

#### Construction Inspection

The workshop covers inspection of concrete, hot mix asphalt, chip seals and soil as performed in the field. The course stresses the importance of inspection, various tests performed and potential failures due to incorrect procedures.

**Provider:** CATSR/Technology Transfer

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Construction Inspectors

**Date/Revised:** 1995

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

### WORKSHOP

#### Guardrail Inspection

To standardize guardrail inspection and installation practices in the Highways Division.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Construction and Maintenance personnel

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1/2 day

**Offer Date:** To be scheduled

**Location:** Phoenix

**Prereqs:** None

## Road Surface and Substructure

### WORKSHOP

#### Maintenance and Construction of Gravel Roads

This workshop focuses upon the major issues concerning maintenance of low volume gravel roads. This course is aimed toward the operational issues and will utilize multimedia presentations, demonstrations, lectures and discussions.

**Provider:** Arizona Technology Transfer Program  
**Contact:** John Hopkins, Manager  
**Phone:** (602)965-2744  
**FAX:** (602)965-2728  
**Audience:** Equipment Operators, Foreman Supervisors  
**Date/Revised:** 1994  
**Cost:** \$35  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Construction or maintenance experience

### WORKSHOP

#### Maintenance and Construction of Rural Paved Roads

This workshop will assist the road crews in identifying the various distresses on paved roads and present methods to use when correcting these problems.

**Provider:** CATSR/Technology Transfer  
**Contact:** John Hopkins, Manager  
**Phone:** (602)965-2744  
**FAX:** (602)965-2728  
**Audience:** Technicians  
**Date/Revised:** 1995  
**Cost:** \$35  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Construction or maintenance experience

### WORKSHOP

#### NICET Preparation for Level II

The purpose of this course is to provide an overview of exam for first-time testers and to enhance math "confidence".

**Provider:** ADOT Human Resources  
**Contact:** Bob Hall  
**Phone:** (602)255-7613  
**FAX:** (602)256-7648  
**Audience:** Maintenance and Construction Technicians  
**Date/Revised:** 1995  
**Cost:** \$0  
**Duration:** 2 days  
**Offer Date:** To be scheduled  
**Location:** Statewide  
**Prereqs:** None

### WORKSHOP

#### Pavement Maintenance

This seminar provides basic and up-to-date information on the proper procedures to be employed in pavement maintenance.

**Provider:** Asphalt Institute  
**Contact:** Bob Campbell  
**Phone:** (602)655-8410  
**FAX:** (602)827-2915  
**Audience:** Engineers and Technicians  
**Date/Revised:** 1994  
**Cost:** \$ 65 to \$100  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Construction or maintenance experience

## Road Surface and Substructure

### WORKSHOP

#### Principles of Construction of Quality Hot-Mix

This course intends to familiarize attendees with the basic principles of hot-mix pavement construction and the inspector's responsibilities at various stages in the construction process.

**Provider:** Asphalt Institute  
**Contact:** Bob Campbell  
**Phone:** (602)655-8410  
**FAX:** (602)827-2915  
**Audience:** Construction Inspectors, Technicians

**Date/Revised:** 1994  
**Cost:** \$65 to \$100  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Construction experience

### WORKSHOP

#### Profilograph Certification

This course certifies field inspectors in operation of mechanical and computerized profilograph use and ADOT test method. The course teaches the setup, operation, and break down and understanding of read outs at both types of profilograph units.

**Provider:** ADOT Human Resources  
**Contact:** Bob Hall  
**Phone:** (602)255-7613  
**FAX:** (602)256-7648  
**Audience:** Construction Inspectors

**Date/Revised:** 1995  
**Cost:** \$0  
**Duration:** 1 day  
**Offer Date:** April (Once a year)  
**Location:** Phoenix  
**Prereqs:** None

### WORKSHOP

#### Rating Roads for Pavement Management

The course will give an overview of data collection methods followed by specific methods of collecting visual distress survey data.

**Provider:** CATSR/Technology Transfer  
**Contact:** John Hopkins, Manager  
**Phone:** (602)965-2744  
**FAX:** (602)965-2728  
**Audience:** Engineers and Field Technicians

**Date/Revised:** 1995  
**Cost:** \$35  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Pavement management experience

### WORKSHOP

#### Storm Water Technology

The course covers practical techniques of determining design storms; rainfall/runoff relationships; sizing of basic drainage structures such as culverts, swells, ditches, and detention/retention impoundments. Limited discussion of water quality issues.

**Provider:** CATSR/Technology Transfer  
**Contact:** John Hopkins, Manager  
**Phone:** (602)965-2744  
**FAX:** (602)965-2728  
**Audience:** Engineers, Flood Plain Administrators, Flood Control Regulators

**Date/Revised:** 1995  
**Cost:** \$50  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Drainage design experience

## Road Surface and Substructure

### WORKSHOP

#### Technician Grade 1

This workshop provides information on concrete placement to prepare technicians.

**Provider:** American Concrete Institute

**Contact:** Mike Kohout

**Phone:** (602)220-5631

**FAX:** (602)220-5348

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$115

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Phoenix

**Prereqs:** Construction experience

### WORKSHOP

#### Use of Asphalt Rubber in Pavement

This workshop will provide the highway community (both agencies and industry) the current understanding of the design procedures and construction practices used to incorporate scrap tire rubber into asphalt paving materials.

**Provider:** CATSR/ Technology Transfer

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Engineers

**Date/Revised:** 1994

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Construction Experience

## Structures

### WORKSHOP

#### Comprehensive Bridge Safety Inspection Training

This course provides the training requirements of the National Bridge Inspection Standards (NBIS) based on the updated "Bridge Inspector's Training Manual 90."

**Provider:** National Highway Institute

**Contact:** Steve Schwab

**Phone:** (602)279-1234

**FAX:** (602)279-1411

**Audience:** Engineers, Construction Workers, Field Technicians, Bridge Inspectors

**Date/Revised:** 1990

**Cost:** \$20,000 for class of 40

**Duration:** 2 weeks

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Bridge inspection, Bridge design

## Construction Vehicle Maintenance And Use

### WORKSHOP

#### Coaching the Maintenance Vehicle Operator

This course helps the experienced equipment operator to be more aware of the hazards of their work and how to prevent injuries and collisions by focusing on safe driving/operations procedures.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Equipment Operators

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Phoenix

**Prereqs:** None

### WORKSHOP

#### Heavy Equipment Operation

Custom designed course to meet the needs of training heavy equipment operators including certification for backhoe, motor grader, loader, truck/transport and commercial drivers license preparation.

**Provider:** Joe Heal, Training Consultant

**Contact:** Joe Heal

**Phone:** (602)723-7805

**FAX:**

**Audience:** Equipment Operators

**Date/Revised:** 1994

**Cost:** \$500 per day for each class

**Duration:** 1-5 days

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Some equipment operations experience

### WORKSHOP

#### Heavy Equipment Operations/ Motor Graders

This one-day workshop offers hands-on motor grader training for beginning and intermediate operators. The course includes classroom instruction in safety, equipment maintenance and operational procedures.

**Provider:** Arizona Technology Transfer Program

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Equipment Operators

**Date/Revised:** 1991

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Some equipment operations experience

## Safety

### **COURSE**

#### **Construction Safety**

Topics include: general building trades safety, portable power tool safety, machinery safety, fire safety, toxic substance safety, emergency first aid care, standard bill of material, standards of measurement, trade math, fastening devices.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** All field operators

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **WORKSHOP**

#### **Hand & Power Tool Safety**

This course trains participants in the hazards of using hand and power tools and the correct tool to use for performing the task. Use of personal protective equipment, various tools, their specific purpose, and how to select and use the "correct" tool.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Phoenix

**Prereqs:** None

### **WORKSHOP**

#### **Mine Safety and Health Administration Annual Requirements**

This course fulfills the annual requirements for an eight hour refresher required by the Mine Safety and Health Administration.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Statewide

**Prereqs:** New miner training

### **WORKSHOP**

#### **New Employee Safety Orientation**

The purpose of this course is to make new ADOT employees aware of safety on the job. The course presents policies and procedures, the use of personal protection equipment, safety programs, accident and injury reporting, haz-com and future safety training.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** All employees

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Statewide

**Prereqs:** None

## Safety

### WORKSHOP

#### Radiation Safety-Nuclear Density

This course provides the initial training required of all individual users of moisture-density gauges. It also provides the mandatory 4-hour safety training which is required annually.

**Provider:** Arizona Radiation Regulatory Agency

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Operators/transporters of radioactive equipment

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 2 days

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

### WORKSHOP

#### Work Zone Safety

This workshop will deal with signs, barricades and other channelizing devices used for work zones and operations around and within these work zones. Safety in the workzone will be emphasized. Information will be provided on the use of channelizing devices

**Provider:** Arizona Technology Transfer Program

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Traffic Technicians

**Date/Revised:** 1994

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Traffic technician level



## Traffic Control

### WORKSHOP

#### Basic Traffic Control

This course provides an overview of traffic control theory and principle in the field - specifically the Phoenix metropolitan area. Application of Chapter 6 MUTCD; description, selection and use of traffic control devices.

**Provider:** ADOT Human Resources  
**Contact:** Bob Hall  
**Phone:** (602)255-7613  
**FAX:** (602)256-7648  
**Audience:** Construction and Maintenance Field Personnel  
**Date/Revised:** 1995  
**Cost:** \$0  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** None

### WORKSHOP

#### Certified Flagger Training

This course is designed to give field personnel a knowledge of correct procedures for flagging. Course also includes the correct signing, clothing, emergency procedures and different applications of flagging.

**Provider:** ADOT Human Resources  
**Contact:** Bob Hall  
**Phone:** (602)255-7613  
**FAX:** (602)256-7648  
**Audience:** Construction and Maintenance Field Personnel  
**Date/Revised:** 1995  
**Cost:** \$0  
**Duration:** 4 hours  
**Offer Date:** To be scheduled  
**Location:** Statewide  
**Prereqs:** None

### WORKSHOP

#### Fire Alarm

Moderated sessions with varying levels of certification in the subject category.

**Provider:** International Municipal Signal Association  
**Contact:** Jan Siedier  
**Phone:** (602)644-2160  
**FAX:** (602)644-3130  
**Audience:** Traffic Technicians  
**Date/Revised:** 1995  
**Cost:** \$140 - \$220  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Traffic technician level

### WORKSHOP

#### Flagging

Moderated sessions with varying levels of certification in the subject category.

**Provider:** International Municipal Signal Association  
**Contact:** Jan Siedier  
**Phone:** (602)644-2160  
**FAX:** (602)644-3130  
**Audience:** Field Technician, Equipment Operator, Construction Worker  
**Date/Revised:** 1995  
**Cost:** \$140 - \$220  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Traffic technician level

## Traffic Control

### WORKSHOP

#### MUTCD Part VI: Revision

This discusses what's new in traffic control, use and application of roadway signing, sign maintenance, according to the latest MUTCD Part VI revision.

**Provider:** Arizona Technology Transfer Program  
**Contact:** John Hopkins, Manager  
**Phone:** (602)965-2744  
**FAX:** (602)965-2728  
**Audience:** Public Works Directors, Engineers, Traffic Technicians  
**Date/Revised:** 1994  
**Cost:** \$35  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Some traffic control experience

### WORKSHOP

#### Portable VMS Board Training

The purpose of this course to understanding basic use and practical application of the portable variable message boards (VMS).

**Provider:** ADOT Human Resources  
**Contact:** Bob Hall  
**Phone:** (602)255-7613  
**FAX:** (602)256-7648  
**Audience:** Construction and Maintenance personnel  
**Date/Revised:** 1995  
**Cost:** \$0  
**Duration:** 1/2 day  
**Offer Date:** To be scheduled  
**Location:** Phoenix  
**Prereqs:** None

### WORKSHOP

#### Public Dispatch

Moderated sessions with varying levels of certification in the subject category.

**Provider:** International Municipal Signal Association  
**Contact:** Jan Siedier  
**Phone:** (602)644-2160  
**FAX:** (602)644-3130  
**Audience:** Technicians, Dispatchers  
**Date/Revised:** 1995  
**Cost:** \$140 - \$220  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Traffic technician level

### WORKSHOP

#### Roadway Lighting

Moderated sessions with varying levels of certification in the subject category.

**Provider:** International Municipal Signal Association  
**Contact:** Jan Siedier  
**Phone:** (602)644-2160  
**FAX:** (602)644-3130  
**Audience:** Traffic Technicians, Engineers  
**Date/Revised:** 1995  
**Cost:** \$140 - \$220  
**Duration:** 1 day  
**Offer Date:** To be scheduled  
**Location:** To be scheduled  
**Prereqs:** Traffic technician level

## Traffic Control

### **WORKSHOP** **Signs & Markings**

Moderated sessions with varying levels of certification in the subject category.

**Provider:** International Municipal Signal Association

**Contact:** Jan Siedier

**Phone:** (602)644-2160

**FAX:** (602)644-3130

**Audience:** Traffic Technicians

**Date/Revised:** 1995

**Cost:** \$140 - \$220

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Traffic technician level

### **WORKSHOP** **Traffic Signals**

Moderated sessions with varying levels of certification in the subject category.

**Provider:** International Municipal Signal Association

**Contact:** Jan Siedier

**Phone:** (602)644-2160

**FAX:** (602)644-3130

**Audience:** Traffic Technicians, Engineers

**Date/Revised:** 1995

**Cost:** \$140 - \$220

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Traffic technician level

## Computer Methods

### WORKSHOP

#### Freeway Systems Analysis Program (FRESYS)

Software application and technical training for freeway capacity analysis

**Provider:** Freeway Systems Research

**Contact:** Mike Penic

**Phone:** (602)786-3170

**FAX:**

**Audience:** Traffic Engineers

**Date/Revised:** 1995

**Cost:** \$300 - \$800

**Duration:** 1 - 3 days

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Traffic Engineering

### WORKSHOP

#### Pavement Management

Learn the concepts and benefits of a PMS. There will be detailed discussion and actual screen display of a simple computerized program, including how the data is entered into the system and display of the reports that can be generated.

**Provider:** Arizona Technology Transfer Program

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Engineers, Administrators, Field Technicians

**Date/Revised:** 1994

**Cost:** \$55

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Some pavement management experience

## Liability and Other Legal Concerns

### **COURSE**

#### **Contractor License and Law**

Topics include: licensing process, business planning, insurance, bonds, mechanics liens, business management, methods of operation, statute and rules, recovery fund, government agencies, money management, contracts, current issues.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Project Managers

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

## Miscellaneous

### **COURSE** **Advanced AutoCAD**

Advanced techniques in use of AutoCAD including construction of three-dimensional objects, symbols, dimensions, text, translation, LISP and advanced plotter use.

**Provider:** Yavapai College  
**Contact:** Larry Strom  
**Phone:** (520) 776-2357  
**FAX:** (520) 776-2209  
**Audience:** Technicians

**Date/Revised:** 1995  
**Cost:** \$66  
**Duration:** Semester  
**Offer Date:** To be scheduled  
**Location:** Prescott  
**Prereqs:** AutoCAD

### **COURSE** **Advanced AutoCAD**

Examines how to use AutoCAD software to draw and edit polylines; set layers, line-types; dimensioning; creating section lines and graphic patterns; design symbols and attributes for multiple use.

**Provider:** Eastern Arizona College  
**Contact:** Bill Karlainsey  
**Phone:** (520) 428-8430  
**FAX:** (520) 428-8462  
**Audience:** Technicians

**Date/Revised:** 1995  
**Cost:** \$44  
**Duration:** Semester  
**Offer Date:** To be scheduled  
**Location:** Thatcher  
**Prereqs:** Intro to AutoCAD

### **COURSE** **AutoCAD**

Theory and practice in application of AutoCAD computer aided design software.

**Provider:** Yavapai College  
**Contact:** Larry Strom  
**Phone:** (520) 776-2357  
**FAX:** (520) 776-2209  
**Audience:** Technicians

**Date/Revised:** 1995  
**Cost:** \$66  
**Duration:** Semester  
**Offer Date:** To be scheduled  
**Location:** Prescott  
**Prereqs:** Drafting course

### **COURSE** **AutoCAD 3D**

Topics include: conversion of 2D to 3D, user coordinate system, multiple viewpoints and 3D spatial navigation, 3D drawing editor commands, 3D color management, 3D blocks, 3D drawing rotation, AutoShade rendering, 3D conversion to 2D plotting.

**Provider:** Northland Pioneer College  
**Contact:** Jim Richmond  
**Phone:** (520) 537-2976  
**FAX:** (520) 524-2227  
**Audience:** Technicians

**Date/Revised:** 1995  
**Cost:** \$20 per credit  
**Duration:** Semester  
**Offer Date:** To be scheduled  
**Location:** Holbrook  
**Prereqs:** AutoCAD I

## Miscellaneous

### **COURSE AutoCAD I**

The course emphasizes operation of computer and software, management of data files, creation of 2-dimensional drawing in the application of CAD design. Includes: system start-up, drawing fundamentals, creating geometrical shapes, editing drawing, plotting.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** Principles of Drafting

### **COURSE AutoCAD I**

Feature, limitations, and considerations associated with the operation of a computer-aided design/drafting (CAD) system (AutoCAD).

**Provider:** Coconino Community College

**Contact:** Dan Bingham

**Phone:** (520) 527-1222

**FAX:** (520) 526-1821

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$27 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Flagstaff

**Prereqs:** High school graduate

### **COURSE AutoCAD I**

Specializing in 2D drawings and the application of CAD. Topics include: system startup, setting up drawings, drawing fundamentals, getting around with display controls, graphic entities, introduction to editing, grouping entities into blocks.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **COURSE AutoCAD II**

Topics include: advanced editing, attributes and data extraction, customizing macro menus, tailoring menu systems, using AutoLISP for drawing automation, grouping entities into blocks, drawing enhancements, dimensioning, plotting drawings.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** AutoCAD I

## Miscellaneous

### **COURSE**

#### **AutoCAD II**

The course emphasizes the management of data files, creation of 3-dimensional drawings in the application of CAD design. Topics include: advanced editing, creating libraries, 3D drawings, alternate coordinate system, import and export of drawings.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** AutoCAD I

### **COURSE**

#### **AutoCAD II**

Advance features of the AutoCAD program. Advance 2D and basic 3D design, using advanced modeling extensions.

**Provider:** Coconino Community College

**Contact:** Dan Bingham

**Phone:** (520) 527-1222

**FAX:** (520) 526-1821

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$27 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Flagstaff

**Prereqs:** AuorCAD I

### **COURSE**

#### **AutoCAD III**

Completes the 3D design and presentation capabilities introduced in AutoCAD II. Creating and customizing menus for increased productivity in drafting. Also introduction to AutoLISP programs.

**Provider:** Coconino Community College

**Contact:** Dan Bingham

**Phone:** (520) 527-1222

**FAX:** (520) 526-1821

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$27 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Flagstaff

**Prereqs:** AutoCAD II

### **COURSE**

#### **AutoCAD Productivity**

Topics include: making a first menu, fine tuning a system, DOS a closer look, creating and editing macros, improving screen menus, designing and creating tablet menus, AutoCAD's advanced user interface, automating drawings.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** AutoCAD I



## Miscellaneous

### WORKSHOP

#### Automated Force Account Detail Program

This course presents information to automatically perform and calculate force account details.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Construction office workers

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Statewide

**Prereqs:** None

### WORKSHOP

#### Basic Metric System

Introduction to the metric system.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Engineers, Technicians

**Date/Revised:** 1991

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

### WORKSHOP

#### Basic Metrics Training

The purpose of this course is to introduce ADOT employees to the upcoming change to metrics within ADOT that will go into effect September 1996.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Engineers, Technicians

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

### WORKSHOP

#### Bloodborne Pathogen (HIV virus & Hepatitis)

This course provides training and information for employees who have potential exposure to bloodborne pathogens. All employees with exposure to bloodborne pathogens receive training at the time of assignment and annually thereafter.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Technicians, Construction field workers

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

## Miscellaneous

### **COURSE CADAM**

Students will gain hands-on experience using CADAM micro based software, microcomputers, input/pointing devices such as digitizers, mice and output devices such as pen plotters.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Intro to AutoCAD

### **COURSE CADKEY I**

Working knowledge of geometric construction and an introduction to computer-aided software program in creating 2D drawings.

**Provider:** Coconino Community College

**Contact:** Dan Bingham

**Phone:** (520) 527-1222

**FAX:** (520) 526-1821

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$27 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Flagstaff

**Prereqs:** High school graduate

### **COURSE CADKEY II**

Advanced knowledge of the 3D capabilities of the CAD software and the Cartesian coordinate system common to most CAD systems with the addition of the Z axis or depth of a given design.

**Provider:** Coconino Community College

**Contact:** Dan Bingham

**Phone:** (520) 527-1222

**FAX:** (520) 526-1821

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$27 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Flagstaff

**Prereqs:** CADKEY I

### **WORKSHOP CII Project Management**

This course is taught in three short courses. Team dynamics, Setting project objectives, Managing inputs to Design for Project success, Scope definition and Control, TQM, Partnering, Project management and schedules are the topics taught in this course.

**Provider:** Alliance for Construction Excellence

**Contact:** Chip Wanner

**Phone:** (602)965-5324

**FAX:** (602)965-8172

**Audience:** Owners, Engineers and Constructors involved in Project Management

**Date/Revised:**

**Cost:** \$200 to \$1500

**Duration:** 1 - 3 days

**Offer Date:** To be scheduled

**Location:** ACE, ASU, Tempe

**Prereqs:** Design and/or construction experience

## Miscellaneous

### **COURSE**

#### **Civil Drafting**

Topics include: drafting equipment/lettering, municipal and rural maps, drainage, plan views, roadway plan and profile sheets, superelevation, earthwork, drainage structure, right-of-way, mathematical procedures, land development, surveying principles.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** Technical Drafting I

### **COURSE**

#### **Computer - Aided Drafting I**

An introduction to the computer as a drafting tool.

**Provider:** Cochise College

**Contact:** Al Walker

**Phone:** (520) 459-9761

**FAX:** (520) 459-9706

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Douglas

**Prereqs:** Drafting (Technical Graphics I)

### **COURSE**

#### **Computerized Estimating**

The evaluation, selection and application of available computerized estimating systems. Topics include: hardware requirements, peripheral options, comparison spreadsheets/data base practice file, key systems capabilities.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Project Managers

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **COURSE**

#### **Construction CAD Practice**

Theory and practice in application of construction with computer aided design software to construction problems.

**Provider:** Yavapai College

**Contact:** Larry Strom

**Phone:** (520) 776-2357

**FAX:** (520) 776-2209

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$66

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Prescott

**Prereqs:** High school graduate

## Miscellaneous

### **COURSE**

#### **Construction Management**

Designed to acquaint students with the skills and knowledge needed to become a construction industry manager.

**Provider:** Yavapai College

**Contact:** Larry Strom

**Phone:** (520) 776-2357

**FAX:** (520) 776-2209

**Audience:** Foremen

**Date/Revised:** 1995

**Cost:** \$66

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Prescott

**Prereqs:** High school graduate

### **COURSE**

#### **Constructuion Supervision**

Topics include: health and safety regulations, legal responsibilities, communications, human behavior, leadership, fundamentals of supervision, personnel motivation, self-evaluation, personal skills improvements.

**Provider:** Nothland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Foremen and Construction Managers

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **WORKSHOP**

#### **Contract Field Documentation**

This course is for field inspectors and office personnel to properly document all construction contract items.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Construction office worker

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

### **COURSE**

#### **Descriptive Geometry**

Studies lines, planes, successive auxiliary views, piercing points, intersection of planes, angles between planes, concurrent vectors, developments and map projections.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Principle of Drafting

## Miscellaneous

### **COURSE**

#### **Drafting (Technical Graphics I)**

Introductory course in technical drafting including orthographic and axonometric construction, sketching, lettering, dimensioning, section conventions, with emphasis on drafting standards.

**Provider:** Cochise College

**Contact:** Al Walker

**Phone:** (520) 459-9761

**FAX:** (520) 459-9706

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Douglas

**Prereqs:** High school graduate

### **COURSE**

#### **Drafting (Technical Graphics II)**

Study of auxiliary and oblique surfaces, intersections, detailing standards, fasteners, materials, and dimensioning with elements of descriptive geometry stressed.

**Provider:** Cochise College

**Contact:** Al Walker

**Phone:** (520) 459-9761

**FAX:** (520) 459-9706

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Douglas

**Prereqs:** Drafting (Technical Graphics I)

### **COURSE**

#### **Engineering Design and Graphics I**

The elements of engineering design, descriptive geometry, nomographs, graphical calculations, simplified drafting, and technical sketching.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** High school graduate

### **COURSE**

#### **Engineering Drafting**

Elements of engineering drawing, orthographic projection, sections, auxiliary views, dimensioning and tolerancing.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** High school graduate

## Miscellaneous

### **COURSE**

#### **Engineering Graphics**

Studies lines, planes, successive auxiliary views, piercing points, intersection of planes, angle between planes, concurrent vectors, developments, and map projections.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Engineering Drafting

### **COURSE**

#### **Estimating Construction**

Techniques and procedure of contract interpretation; material selection; labor and time estimation.

**Provider:** Cochise College

**Contact:** Al Walker

**Phone:** (520) 459-9761

**FAX:** (520) 459-9706

**Audience:** Construction Managers

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Douglas

**Prereqs:** Technical Math I and Drafting I

### **COURSE**

#### **Estimating II**

Estimating materials, labor, and other costs for bids. Topics include: estimating resource book, take offs, material costs, direct labor costs, labor burden, equipment rate costs, other direct costs, contingency, escalation, bid formats, bid procedures.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Project Supervisors and Managers

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **WORKSHOP**

#### **FHWA Demo: GIS/Video Imagery Applications**

This two-day FHWA demonstration project will show state of the art GIS and video imagery systems with hands-on classroom demos of GIS software & workstations, laser videodisc software & workstations and a van equipped with an electronic video camera.

**Provider:** Arizona Technology Transfer Program

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Engineers, Technicians, Administrators

**Date/Revised:** 1994

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

## Miscellaneous

### WORKSHOP

#### First-On Scene Hazardous Materials Training

This course explains and teaches the importance of identification and isolation in a hazardous materials incident. Also, how to protect people and environment at the site of an incident.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Statewide

**Prereqs:** None

### WORKSHOP

#### Force Account Documentation & Administration

This course is designed to help both field inspectors and office personnel to properly document construction force account work. Topics include proper reporting documents and administration requirements.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Field Inspectors, Construction office workers

**Date/Revised:** 1995

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Statewide

**Prereqs:** None

### COURSE

#### Intro to AutoCAD

Students will gain hands-on experience using AutoCAD micro based software, microcomputers, input/pointing devices such as a mice and output devices such as the pen plotter.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Principle of Drafting

### COURSE

#### Introduction to Languages of Engineering

Computer programming using a scientific computer language (FORTRAN or C), freehand drawing, visualization and computer graphics.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** Introductory Algebra

## Miscellaneous

### **COURSE**

#### **Introduction to Computer-Aided Drafting**

The course provides the student with an overview of systems, file management, hardware, and program structure using the VersaCAD software.

**Provider:** Arizona Western College

**Contact:** Gonzalo Huerta

**Phone:** (520) 344-7567

**FAX:** (520) 344-7730

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Yuma

**Prereqs:** Basic Drafting courses

### **COURSE**

#### **Introduction to Computer-Aided Engineering**

Computer-aided analysis and design, computer graphics, modeling, optimization and graphic documentation.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** Introduction to Languages of Engineering

### **COURSE**

#### **Introduction to Engineering**

Introduction to the fundamental concepts and techniques encountered in the practice of the engineering profession.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** High school graduate

### **COURSE**

#### **Introduction to Engineering Design**

Analysis, design, construction, and testing of engineering projects. Drawing fundamentals. Dimensional analysis, materials and processes, statistical analysis and curve fitting. Engineering problem solving.

**Provider:** Yavapai College

**Contact:** Larry Strom

**Phone:** (520) 776-2357

**FAX:** (520) 776-2209

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$66

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Prescott

**Prereqs:** Precalculus Math



## Miscellaneous

### WORKSHOP

#### Introduction to Metrics

This workshop will demonstrate basic calculations using metric units. The course is for personnel involved in preparing for the conversion of all measurements to the metric system. This will be practical training for field operational persons.

**Provider:** CATSR/Technology Transfer

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Field personnel

**Date/Revised:** 1995

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Basic mathematics

### WORKSHOP

#### Maintenance Mathematics

Basic mathematics for maintenance personnel.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Maintenance personnel

**Date/Revised:** 1991

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

### COURSE

#### Map Drafting

Studies basic elements of map drafting including symbols, plotting contour lines, grid maps, elevation and profiles, closed and open traverse.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Principles of Drafting

### COURSE

#### Materials of Construction

The properties of common materials used on construction with emphasis on materials under stress, qualities of materials, and uses of materials.

**Provider:** Yavapai College

**Contact:** Larry Strom

**Phone:** (520) 776-2357

**FAX:** (520) 776-2209

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$66

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Prescott

**Prereqs:** High school graduate

## Miscellaneous

### WORKSHOP

#### Metrication

This workshop will give a timetable and an overview of the new guidelines. A 3" binder of excellent resource and reference material will be distributed as the course material.

**Provider:** Arizona Technology Transfer Program

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Engineers, Design Technicians

**Date/Revised:** 1994

**Cost:** \$55

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Basic mathematics

### COURSE

#### OSHA Health and Safety Training

This course is taught in various short courses. 40 hour OSHA Hazardous materials health and safety training, hazardous materials manager and supervisor training and 8 hour hazardous materials annual update are included.

**Provider:** ASETT Center

**Contact:**

**Phone:** (520)722-7872

**FAX:** (520)722-7825

**Audience:** Engineers, Technicians

**Date/Revised:** 1995

**Cost:** \$90 to \$480

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** Tucson

**Prereqs:** None

### COURSE

#### Plane Surveying

Principles and practices of general surveying, chaining, leveling, stadia, and extensive field work using leveling and EDM.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Plane Trigonometry

### COURSE

#### Plane Surveying

Theory and field work in land surveys and basic mapping.

**Provider:** Yavapai College

**Contact:** Larry Strom

**Phone:** (520) 776-2357

**FAX:** (520) 776-2209

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$66

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Prescott

**Prereqs:** High school graduate

## Miscellaneous

### **COURSE**

#### **Plane Surveying (Drafting)**

Fundamentals of plane surveying; theory use and adjustment of the tapes, engineer's level, compass, and transit. The application of surveying methods to problems of leveling, line direction, measurement of distance, and transverse computation.

**Provider:** Arizona Western College

**Contact:** Gonzalo Huerta

**Phone:** (520) 344-7567

**FAX:** (520) 344-7730

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Yuma

**Prereqs:** High school graduate

### **COURSE**

#### **Plane Surveying (Engineering)**

Surveying instruments and basic procedure including error analysis, note keeping, measurement of distance, elevation and angles with appropriate precision, traversing, stadia, and topographic mapping.

**Provider:** Arizona Western College

**Contact:** Gonzalo Huerta

**Phone:** (520) 344-7567

**FAX:** (520) 344-7730

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Yuma

**Prereqs:** College Algebra and Trigonometry

### **WORKSHOP**

#### **Preparing Plans and Specs in Metrics**

The workshop is intended for personnel involved with design who will need to use the new metric units.

**Provider:** CATSR/Technology Transfer

**Contact:** John Hopkins, Manager

**Phone:** (602)965-2744

**FAX:** (602)965-2728

**Audience:** Design Engineers and Technicians

**Date/Revised:** 1995

**Cost:** \$35

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** Basic mathematics, Plans preparation

### **COURSE**

#### **Principles of Drafting**

A basic study of drafting which includes orthographic projection, lettering, section and auxiliary views, dimensioning, threads, and fasteners.

**Provider:** Central Arizona College

**Contact:** Ed Peters

**Phone:** (520) 426-4310

**FAX:** (520) 426-4234

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$25 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Coolidge

**Prereqs:** High school graduate

## Miscellaneous

### **COURSE**

#### **Principles of Drafting**

Course content included use of drafting equipment, drafting techniques, lettering, geometric construction, multiview and isometric drawings, sectional and auxiliary views, basic dimensioning.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** High school graduate

### **COURSE**

#### **Structural Drafting**

Studies basic elements of structural drafting including symbols, dimensional design and detail drawings of steel, concrete, and wood structures.

**Provider:** Eastern Arizona College

**Contact:** Bill Karlainsey

**Phone:** (520) 428-8430

**FAX:** (520) 428-8462

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$44

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Thatcher

**Prereqs:** Principles of Drafting

### **COURSE**

#### **Surveying I**

Topics include: history and definitions of surveying, theory of measurements and errors, field notes, distance measurements; taping, electronic distance measurement, leveling-theory, angles, bearings and azimuths, the compass, traversing.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **COURSE**

#### **Surveying II**

Topics include: stadia, topographic mapping, the plane table, adjustment of instruments, determination of meridian, photogrammetry, boundary surveys, surveys of public lands, construction surveys, circular curves, parabolic curves, volumes.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** Surveying I and Trigonometry

## Miscellaneous

### **COURSE**

#### **Surveying III**

The use of programmable calculators and computer programs for surveying problems. Topics includes: setting and adjustments, organization of the keyboard and display, stack and command line, objects, calculator memory, solving surveying problems.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** Surveying II

### **COURSE**

#### **Technical Mathematics II**

A comprehensive study of trigonometry as applied to electronics and drafting situations.

**Provider:** Cochise College

**Contact:** Al Walker

**Phone:** (520) 459-9761

**FAX:** (520) 459-9706

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Douglas

**Prereqs:** Technical Mathematics I

### **COURSE**

#### **Technical Drafting I**

Basic skills for technical drafting. Topics include: Language of industry, drafting skills, drafting office practices, theory of shape description, applied geometry, basic dimensioning.

**Provider:** Northland Pioneer College

**Contact:** Jim Richmond

**Phone:** (520) 537-2976

**FAX:** (520) 524-2227

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$20 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Holbrook

**Prereqs:** High school graduate

### **WORKSHOP**

#### **Technical Mathematics**

Basic Technical mathematics for the engineer and technician.

**Provider:** ADOT Human Resources

**Contact:** Bob Hall

**Phone:** (602)255-7613

**FAX:** (602)256-7648

**Audience:** Engineers, Technicians

**Date/Revised:** 1991

**Cost:** \$0

**Duration:** 1 day

**Offer Date:** To be scheduled

**Location:** To be scheduled

**Prereqs:** None

## Miscellaneous

### **COURSE**

#### **Technical Mathematics I**

A review of arithmetic and the study of fundamentals of algebra and geometry applied to practical problems of the drafting room, machine shop and engineering.

**Provider:** Cochise College

**Contact:** Al Walker

**Phone:** (520) 459-9761

**FAX:** (520) 459-9706

**Audience:** Technicians

**Date/Revised:** 1995

**Cost:** \$26 per credit

**Duration:** Semester

**Offer Date:** To be scheduled

**Location:** Douglas

**Prereqs:** High school graduate